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A DANGEROUS TOBACCO DISEASE APPEARS IN THE UNITED STATES

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A DANGEROUS TOBACCO DISEASE APPEARS IN THE UNITED STATES.

At telegraphic request of Florida tobacco growers, the tobacco seed beds in the vicinity of Quincy, Fla., were visited on March 29, 1921, and found badly infected with a mildew which was at once recognized as being different from any tobacco disease previously observed by us in the United States and one in certain respects similar to the diseases reported from Malaysia and Australia.

The disease made its appearance in Gadsden County, Fla., on four widely separated seed beds at about the same time, i. e., about March 21, 1921, although in one of these cases the farm superintendent reported that one end of a bed showed something wrong with it about a week earlier. Of the four beds referred to, two had been steam sterilized by the inverted-pan method every year for a number of years, one was a new swamp bed that had been burned, and the fourth, which was possibly a day later than the others in showing the infection, was not sterilized in any way. According to the statements of the tobacco growers, the disease usually made its appearance near one end and then spread over the rest of the bed, in some cases by direct enlargement of the infected spot and in other cases through the development of other small infected spots and the subsequent enlargement of them. In most cases the entire bed became diseased within a week from the time of the appearance of the first infected spot in the bed. By April 5 the mildew had spread to at least 26 seed beds in Gadsden County and by April 8 it was reported from a number of seed beds in the adjoining county (Decatur) in Georgia. In all probability by this time (April 14) all of the tobacco seed beds in Gadsden County, Fla., and Decatur County, Ga., are more or less infected. In brief, practically all of the cigar-wrapper area in the Florida-Georgia district is now infected with this disease, and the tobacco growers in this region have been on the verge of a panic because there are not enough healthy tobacco plants in sight to set out the fields. This district is the oldest cigar-wrapper area in the United States, and millions of dollars of capital are endangered.

At the time this disease made its appearance this Florida-Georgia region had been suffering from a lack of rainfall, although this in many of the seed beds was made up for by overhead irrigation. During some days immediately preceding the outbreak of the disease and for a few days after the appearance of the disease there was a heavy dew and fog each morning, dissipated before 9 o'clock by the hot, dry sun. During the subsequent period these morning dews and fogs did not occur. Thinly sown seed beds suffered from the disease as badly as those thickly sown.

The disease appears to be due to *Peronospora hyoscyami*, originally described by De Bary from the black nightshade (*Hyoscyamus niger*) in Europe. It does not appear to have done any damage on tobacco in Europe, but it has been known for many years as a destructive parasite of tobacco seed beds in Australia (New South Wales and Victoria), where it is known as the tobacco blue mold. It has also been reported from South Africa. In 1885 it was reported by Dr. W. G. Farlow on a shrubby wild tobacco (*Nicotiana glauca*) in southern California, which plant was introduced from Argentina. Dr. Farlow, who saw it at San Diego, described it as a bad parasite on this plant, and pointed out at that time the danger of its spreading to cultivated tobacco should it ever migrate into the eastern United States. The disease must occur also in Texas, since the mycological collections of the Department of Agriculture received in 1906 on cultivated seedling tobaccos a Peronospora, the examination of dried material of which leads us to think it identical with the Florida fungus. This came from Hallettsville, west of Galveston.

It is not known how the disease was introduced into Florida. In view of the fact that the Florida-Georgia growers for the most part raise their own seed and that the little seed which has been introduced from outside has come from reputable planters in Connecticut, it is not likely that the disease was introduced into this territory on imported seed. No definite statement as to the probable means of introducing the disease into the United States can be made at present. However, it must be borne in mind that the mats used in baling tobacco in this region are imported annually from Sumatra, arriving in Florida in the month of September, about the time the harvested seed is being cleaned and stored away. It is known that certain insects have been introduced into the United States on such mats, and it is not impossible that this disease may have been introduced into the United States through this agency, especially as many of the mats are second-hand, having been previously used on East Indian tobacco. On the other hand, the disease may have come into Florida by the way of California and Texas, particularly if the species does not produce resting spores and if the fungus on *Nicotiana glauca* in California is identical, as Dr. Farlow stated; or in this case it may have come directly from the ballast heaps of the South Atlantic or Gulf seaboard, since a search through the collections of the National Herbarium shows *Nicotiana glauca* to have been collected at Camden, N. J. (1897), Quarantine Station, S. C. (1889), and several times at Pensacola, Fla. (1880, 1897, 1903, etc.).

The rapid spread of the disease through the Florida-Georgia area is easily explained. The fungous spores are produced in great numbers, and are dry, powdery, and very light, and the weather conditions were ideal. Observation indicates unquestionably that a large part of this spread of the disease from bed to bed has been through the agency of visitors going from infected beds to healthy beds, carrying the spores on their feet and clothing. The spread through any particular bed is undoubtedly due largely to the agency of the wind. It is probable also that some of the spreading from bed to bed has been brought about through the agency of the wind.

The outcome of this mildew disease in the United States can not now be predicted, but it is likely that the long-suffering tobacco grower will, from now on, have to contend with another destructive disease and that he can only succeed in growing tobacco successfully when he uses all the methods at his command for controlling the enemy, namely, beds of sterilized soil, seed of undoubted purity, and hygienic measures in the care of the seedlings, so that the disease can not be introduced from other beds into his beds. To this end the beds should be separated from each other as widely as possible *and visitors should be rigidly excluded.*

A very important question arises immediately as to whether it is safe for planters to set out from diseased seed beds the remaining apparently sound seedlings. In Australia the bulk of the disease has been always in the seed beds. Diseased plants transplanted to the fields have in the course of time died and have not generally transmitted the disease to plants that were healthy when set out, but it must be remembered in this connection that the Australian climate is a much drier climate than our own Florida climate and also that the tobacco grown in Australia is grown in the open, whereas the fine wrapper tobacco of Florida is grown under expensive lath or cloth shade, which increases the moisture conditions very decidedly over plants grown in the open. It is to be noted in this connection that when a disease is introduced into a foreign country it very often does much more serious damage than it did in its original home, so that taking all the facts into consideration it seems to us very unsafe to plant any of these shaded fields with seedlings from infected beds. In fact, we think it would be better to abandon the culture of tobacco in these shaded fields for this year where it is not possible to set with plants that are known to be healthy. Such fields should be planted to corn or some other crop not subject to the parasite rather than run the risk of introducing the parasite generally into the highly fertilized shade-covered fields. Furthermore, persons who have tramped through infected seed beds should not be allowed to enter sound fields.

Immediately on the appearance of this disease we recommended the destruction of the first few beds, which were entirely diseased. We also recommended spraying those seed beds not already infected or only infected to a slight degree with a dilute Bordeaux solution (2–2–50 formula). In one large seed bed where the disease made its appearance in two small spots the plants in those spots were killed by direct application of kerosene—the only agent available at that time—and the remainder of the bed sprayed with dilute Bordeaux daily.

It is stated by certain Australian authorities that Bordeaux has not proved an effective remedy in their country. In the Florida area the spraying with Bordeaux seems to have had a good effect, not only in the bed previously mentioned but in a number of others. But it still remains to be seen whether it will be generally efficacious in holding the plague in check. It is believed that better results will be obtained with the Bordeaux by applying it late in the afternoon, when there is a certain tendency of the leaves of the tobacco seedling to stand erect, thus permitting a more ready application of the spray to the under side of the leaves, where the infection is most likely to take place.

Tobacco planters throughout the Southern States and in Wisconsin, Pennsylvania, and Connecticut should be on their guard against the introduction of this disease into their fields. It belongs to a group of very destructive parasites, hard to control when once introduced.

A full account of the parasite and measures for its control, if such can be found, will be published at a later date.

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